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1. (Amended) A process for selectively amplifying nucleic acid sequences comprising contacting multiple single stranded non-circular random oligonucleotide primers (P1), one or more amplification target circles (ATCs), a DNA polymerase and multiple deoxynucleoside triphosphates (dNTP), under conditions promoting said contacting, wherein one or more ATCs hybridizes to more than one of said multiple P1 primers, wherein said conditions promote replication of said amplification target circle by extension of the P1 primers to form multiple tandem sequence DNA (TS-DNA) products and wherein said multiple deoxynucleoside triphosphates (dNTP) are selected 5 from the group consisting of dTTP, dCTP, dATP, dGTP, dUTP, a naturally occurring dNTP different from the foregoing, an analog of a dNTP, and a dNTP having a universal base and wherein at least one nucleotide renders the TS-DNA 10 resistant to nuclease activity following incorporation thereinto.

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27. (Amended) The process of claim 1 wherein at least one said dNTP is 15 radiolabeled.

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29. (Amended) The process of claim 1 wherein said at least one nucleotide is a phosphorothioate nucleotide.

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30. (Amended) The process of claim 1 wherein said nuclease activity is 20 due to an endonuclease.

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31. (Amended) The process of claim 1 wherein said nuclease activity is 25 due to an exonuclease.

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34. (Amended) The process of claim 1 wherein said nuclease activity is due to a contaminating nuclease.

*sub
D
Cle
CONX*

35. (Amended) The process of claim 1 wherein said at least one nucleotide is a modified nucleotide.

*CJ sub
D 5*

50. (Amended) The process of claim 49 wherein the 3'-terminal nucleotide of the primer can be removed by 3',5'-exonuclease activity.

*OS
sub
D 10*

56. (Amended) The process of claim 55 wherein said DNA polymerase is selected from the group consisting of DNA polymerases lacking a 3'-5' exonuclease activity, such as Taq, Tfl, and Tth DNA polymerase, Eukaryotic DNA polymerase alpha, and DNA polymerases that have been modified to eliminate a 3'-5' exonuclease activity selected from the group consisting of the exo (-) versions of ϕ 29 DNA polymerase, Klenow fragment, Vent and Pfu DNA polymerases.

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59. (Amended) The process of claims 38 wherein said multiple primers are a mixture of primers sensitive to exonuclease activity and resistant to exonuclease activity.

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60. (Amended) The process of claims 38 wherein a linear DNA target is used instead of said ATC.

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61. (Amended) The process of claim 56 wherein said DNA polymerase is ϕ 29 DNA polymerase.

REMARKS